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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/580,138	Applicant(s) DANERI ET AL.	
	Examiner Carl D. Price	Art Unit 3749	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 July 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims 1-29 have been considered but are moot in view of the new ground(s) of rejection.

Applicant has amended the claims to be of a scope not previously considered. Consistent with applicant's argument that the prior art relied on in the previous office action fail to show, disclose and/or teach certain aspects of applicant's invention now recited in the claims filed on 07/16/2010, applicant has amended the claims to include at least the following:

Claim 1 (Amended)

A gas burner **having low emissions of polluting agents** comprising a main metal body **open at a first base end, having a housing for a gas distributor at a second base end wherein said housing has a volume inside thereof and an internal lining of a coating of refractory material,** an inner **central** lance for combustible gas **arranged inside said main metal body,** at least two outer side lances for combustible gas associated with said main metal body, a single duct for the **introduction** of pre-heated air **where said single duct is connected to a side surface of said main metal body,** a regulation system for the combustible **gas,** a refractory unit **associated with said first base end,** characterized in that said gas burner comprises a series of nozzles **situated in said refractory unit** for the injection of the pre-heated air into **a combustion chamber of an oven, said series of nozzles being in communication with a plenum defined by the volume inside said housing that is internally lined with a coating of refractory material and is located between the inner central lance and the outer side lances** and in that, **said** gas regulation system **comprises means for varying the distribution percentage of the combustible gas between the inner central lance and the outer side lances thereby,** switching from a flame functioning mode of the burner, **wherein the combustible gas is injected to said combustion chamber through said inner central lance alone,** to a flameless functioning mode, **wherein the combustible gas is injected to said inner central lance alone.**

Claim 2 (Amended)

“... said refractory unit comprises a first region, a second region, a third region, which are concentric, said first region in turn comprising a series of calibrated holes **and a central, hole, having an inner surface from which the gas flows out and which houses a tip portion of said inner central lance where said tip portion has an external diameter,** a free annular crown **being defined between the inner surface of**

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said central hole and the external diameter of said tip portion of the inner central lance, said free annular crown being in communication with said plenum thereby allowing the passage of a sufficient quantity of **pre-heated** air suitable for preventing the overheating of the inner **central** lance.

In response to the prior art of record cited in the previous examiner's action and in support of the scope of the invention now presented in the amended claims, applicant argues the following:

“Claim 1 has been amended in order to avoid the objections raised by the Examiner under both 35 U.S.C. §112, second paragraph, for failing to particularly point out and distinctly claim the subject matter that the applicant regards as the invention.”

Applicant's remarks regarding objections raised by the Examiner under both 35 U.S.C. §112, second paragraph are noted. However, as more clearly set forth in the following Examiner's action herein below, claims 1-29 are yet again rejected under 35 USC 112 as being narrative in form and replete with indefinite and functional or operational language. Applicant is again reminded that the structure which goes to make up the device must be clearly and positively specified. And, the structure must be organized and correlated in such a manner as to present a complete operative device.

In response to applicant's argument(s) directed to the prior art previously relied on, and in response to the scope of the invention now set forth in the presently amended claims, the following examiner's action again relies on the prior art reference(s) of **US 3418062 (Hovis et al)** in view of **US 3958413 (Cornelius et al)** or **US 5570679 (Wunning)**..

Accordingly, while applicant's arguments have been carefully considered, applicant's claims do not patentably distinguish applicant's invention over the prior art of record.

See the examiner's action herein below.

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Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “base surface of the second region (32) and the base surface of the third region (33) of the refractory unit (30) are aligned with an internal wall (70) of the oven” must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

Claim 1, at line 24, is objected to because of the following informalities:

The term - - a- - should be inserted before “percentage”.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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The claim(s) are narrative in form and replete with indefinite and functional or operational language. The structure which goes to make up the device must be clearly and positively specified. The structure must be organized and correlated in such a manner as to present a complete operative device. Note, for example, the following:

- In **claim 1**, while the claim does recite "an inner central lance" and "at least two outer side lances" each generally associated with the metal body, the claim lacks any structure which would provide an otherwise meaningful association of these elements in a manner which would necessarily define the subject "gas burner". For example, while the claim does recite a housing with the intended use of being associated with a mentioned but an otherwise not claimed "gas distributor", there is no structure necessarily interconnecting or associating the inner central lance to the housing, or a gas distributor. Indeed, regarding the recitation "for a gas distributor ...", it is unclear if the claimed invention is intended to necessarily include this feature and, if so, what relationship it might have regarding the subject gas burner, the inner central fuel lance and the at least two outer side lances. Similarly, while the "at least to outer side lances" are generally associated with the metal body no structure or means are defined in the claim which would otherwise link these elements to any positively recited structure necessarily going to make up the subject "gas burner". Furthermore, regarding the at least two outer lances, it is unclear with respect to what previously recited element these at least two lances are located outward. Are the outer lances positioned in an "outer" orientation relative to, for example, an outer surface of the metal body? Are the at least two outer lances located radially outward with respect to a central longitudinal axis of the metal body, and there outwardly located with respect to the inner central lance positioned along the metal body longitudinal axis? From the discussion immediately presented herein above it can be seen that applicants claim for the most part amounts to an only loose presentation of parts or elements intended to be connected to a pre-heated air supply and a combustible gas supply, which falls short of actually defining and/or orienting these elements in a manner necessarily representative of the claimed subject "gas burner". In this regard,

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the structure defined in claim 1 amounts to nothing more than a list of only loosely associated parts intended to be used in conjunction with (“for a gas distributor”, “for a combustible gas”, etc.) but not actually claiming a gas burner. As such the elements recited in claim 1 are not organized and correlated in such a manner as to present a complete operative device. While the discussion in this regard has only focused on most of that which is recited in the first half claim 1, applicant is advised that the remained of claim 1, as well as the remaining claims should be reviewed for further and similar informalities. For example, it is unclear what role the “series of nozzles” necessarily play in forming the subject gas burner, by merely being in communication with a plenum defined by the volume within the housing. Are these nozzles configured to receive said pre-heated air? Are these nozzles intended to distribute pre-heated air to the “a gas distributor”, for example?

- The term(s) “low” (i.e. – “low emissions”) and “outer” (i.e. – at least two outer side lances”) in claim 1 are relative term(s) which renders the claim indefinite. The term “low” and “outer” are not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.
- In **claim 1**, in the last several lines, the recitation “... a ***flame functioning mode*** of the burner, wherein the combustible gas is injected to said combustion chamber through said ***inner*** central lance alone, to ***a flameless functioning mode***, wherein the combustible gas is injected to said ***inner*** central lance alone.” This representation of the invention is not consistent with applicant’s remarks submitted with the amendment. In this regard, applicant’s remark include the following statement(s):
 - o “The ***flame functioning mode*** has been specified to be that in which “the combustible gas is injected to said combustion chamber through said ***inner central lance alone***” Support for this amendment is found at page 12, lines 19-21, and page 14, lines 1-3, of the specification.
The ***flameless functioning mode*** has been specified to be that in which “the combustible gas is injected to said combustion chamber through said ***outer side lances alone***” Support for this amendment is found at page 12, lines 19-25; and page 13, lines 1-5 and page 14, lines 1-3 of the specification.”
(Bolding and Highlighting added)

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Based on applicant's remarks the second recitation of "said inner central lance alone" should be said outer side lances alone.

The above noted informalities are merely representative of informalities present in the claims. Applicant should therefore review all of the claims for further and similar informalities.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims Rejected under 35 U.S.C. 102(b)

Claims 1, 3, 5, 7, 8 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by **US 3418062 (Hovis et al)** in view of **US 3958413 (Cornelius et al)** or **US 5570679 (Wunning)**.

In regard to **claim 1**, **US 3418062 (Hovis et al)** shows and discloses a gas burner capable of a gas burner having low emissions of polluting agents (11 or 124; figures 8-11) comprising:

- a main metal body (68'; fig. 8) **open at a first base end (84')**;
- **a housing (114) for a gas distributor (88', 90) at a second base end**
 - o **wherein said housing has a volume inside thereof and an internal lining of a coating of refractory material (82'; "...the inward protruding end of the inner port block 82' the annular fuel conduit 114 is extending thereover ...")**;

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- an inner **central** lance (92') for combustible gas (see; "GAS"; fig. 8) **arranged inside said main metal body (68')**;
- at least two outer side lances (116; "gas flow grooves") for combustible gas associated with said main metal body (i.e.- Note that the gas lances (116, grooves) are located radially outward of the central lance, and as such are understood to be "outer side" lances. That is, with respect to the inner central lance. Also, the fuel being fed to the gas lances (116, grooves) is supplied thereto by conduit 112 passing through the main metal body (68'), and as such the lances are understood to be for combustible gas *associated with said main metal body.*)
- a single duct (fed by valve 104; figure 8, or duct 132, 138; figure 10) for the **introduction** of air (Note that since the laterally placed air duct merely labeling the duct as "single" is not sufficient in itself to preclude the presence of other air duct. And, as the duct is formed as a single passage, it is therefore understood as a "single duct") **where said single duct is connected to a side surface of said main metal body;**
- a regulation system (106', 120) for the combustible **gas**;
- a refractory unit (78') **associated with said first base end**, characterized in that said gas burner comprises a series of nozzles (80') **situated in said refractory unit** for the injection of the air into **a combustion chamber of an oven (10, 10A; Note that the chamber 10, 10A of US 3418062 (Hovis et al) is disclosed as a "soaking pit" and "soaking pits are widely used throughout the steel industry for heating ingots of steel to rolling or forging temperature."** Since ovens perform the same function of heating articles placed therein the soaking pit of US 3418062 (Hovis et al) is patentably indistinguishable from applicant's only broadly claimed oven);
 - o **said series of nozzles (80') are in communication with a plenum (94', fig. 8; or 128, fig. 10) defined by the volume inside said housing and is located between the inner central lance and the outer side lances;** and
 - o said gas regulation system comprises means for varying the distribution percentage of the combustible gas between the inner central lance and the outer side lances thereby, switching between functioning modes.

US 3418062 (Hovis et al) shows and discloses the invention substantially as set forth in the claims with possible exception to:

- means introducing pre-heated air;

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- wherein when operating on the gas regulation system, it is possible to continuously switch from a flame functioning mode of the burner to a flameless functioning mode, the latter characterized by low emissions of polluting agents.

US 3958413 (Cornelius et al) teaches, from applicant's same multi-mode flame and flameless burner field of endeavor, means introducing pre-heated air and wherein when operating on the gas regulation system, it is possible to continuously switch from a flame functioning mode of the burner to a flameless functioning mode (i. e. - "invisible burning"), the latter characterized by low emissions of polluting agents.

US 3958413 (Cornelius et al) shows:

U.S. Patent May 25, 1976 Sheet 1 of 2 3,958,413

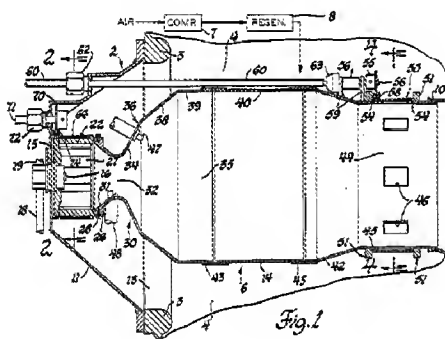


Fig. 1

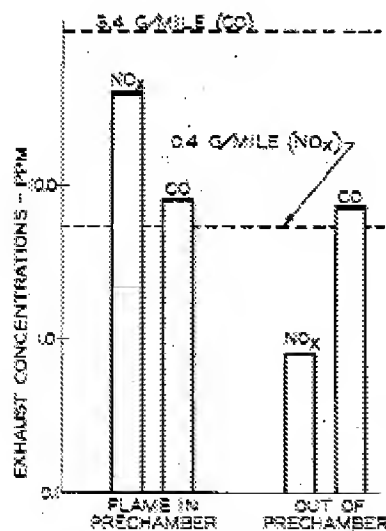


Fig. 5

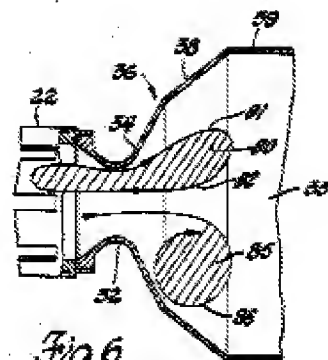


Fig. 6

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US 3958413 (Cornelius et al) discloses:

(1) Referring first to FIG. 1, the combustion apparatus 2 illustrated is a part of a small gas turbine engine such as might be used for propulsion of automobiles. Since the invention can be understood without reference to details of the engine, these are omitted. The engine in which the combustion apparatus is used is preferably a regenerative engine; that is, one in which the **compressed air flowing to the combustion apparatus is heated by heat exchange** with gases exhausting from the turbine of the engine. A regenerative engine is favorable to the practice of our method of combustion, since it involves vaporization of the fuel prior to combustion which may most readily be accomplished with relatively hot air entering the combustor. In a regenerative engine, the air entering the combustor may be of the order of 900.degree.F. or more during the normal engine operating regime. (Highlighting and Underlining Added)

(31) With **hot air** supplied to the combustion apparatus through a regenerator, recirculation is not needed to secure vaporization of the droplets of fuel sprayed by the nozzle 16. During light-off, particularly with a cold engine, the air is relatively cool, being heated to some extent by compression, but it is not sufficiently warm to achieve good vaporization of the fuel. This is promoted by recirculation of flame or combustion products during the swirling start-up operation. (Highlighting and Underlining Added)

(23) **When the flame** has been established and is **fully expelled from the prechamber,** there is substantially **invisible burning** in the **reaction chamber recirculation zone 85** of the previously formed mixture of vaporized fuel and air. This is attended by extremely low emissions of carbon monoxide and nitrogen oxides, as well as unburned hydrocarbons and smoke, which are much less a problem than are carbon monoxide and nitrogen oxides. (Highlighting and Underlining Added)

(24) **FIG. 5 illustrates the magnitude of the reduction in the emissions of nitrogen oxides** that can be obtained when the flame is forced out of the prechamber while using the combustion apparatus shown in FIGS. 1 through 4 and operated as described above. Note that the vertical scale is a logarithmic scale of nitrogen oxide and carbon monoxide concentrations in parts per million. Concentration data are shown for a typical stabilized combustor operating condition where the flame is either in or out of the prechamber. The broken line identified as 3.4 g/mile (CO) represents the maximum allowable carbon monoxide content, assuming a vehicle fuel consumption of ten miles per gallon. The broken line identified as 0.4 g/mile (NO.sub.x) represents the allowable production of nitrogen oxides, assuming the same fuel consumption. (Highlighting and Underlining Added)

(26) The **flame may be kept out of the prechamber** and stabilized in the reaction chamber for various rates of fuel and air flow **by suitable modulation of the primary and secondary air entrance areas.** These may be coupled to an **automatic control which has been calibrated in terms of the characteristics of the particular**

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combustion apparatus discharging through the particular turbine nozzle or other structure. The opening of the primary or secondary ports may be controlled as a function of air pressure, fuel pressure, engine power level setting or other parameter related to the level of engine operation and air flow. (Highlighting and Underlining Added)

US 5570679 (Wunning) teaches, from applicant's same multi-mode flame and flameless burner field of endeavor, teaches, from applicant's same multi-mode flame and flameless burner field of endeavor, means introducing pre-heated air (15) and wherein when operating on the gas regulation system (22, 23, 30), it is possible to continuously switch from a flame functioning mode of the burner to a flameless functioning mode (i. e. - "an essentially flame-- and pulsation-free reaction"), the latter characterized by low emissions of polluting agents.

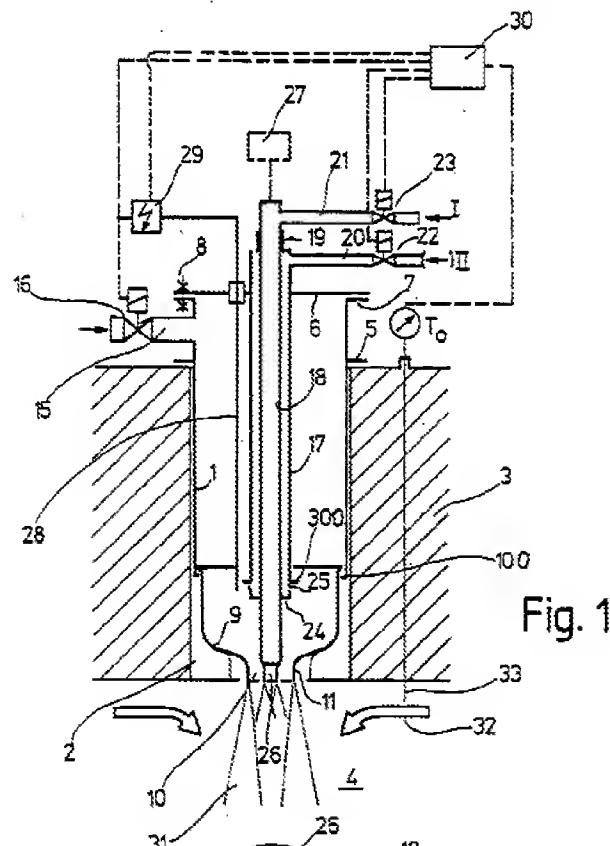
US 5570679 (Wunning) shows:

U.S. Patent

Nov. 5, 1996

Sheet 1 of 5

5,570,679



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US 5570679 (Wunning) discloses:

(18) A further **lowering of NO_x emissions** is enabled, conversely, by a more recent impulse burner (U.S. Pat. No. 5,154,599, claiming the priority of European Patent 0 463 218), in which **once the ignition temperature in the heating chamber is reached**, the combustion air is **switched over** entirely to an external nozzle ring, and consequently no further combustion occurs in the combustion chamber. For **a specified nozzle geometry**, extremely low NO_x values can then be attained (below 10 ppm). **With externally preheated air**, however, two hot air valves are needed in this burner, while in the version as a recuperator and regenerator burner, the combustion air, in the heating-up mode, does not flow via the heat exchangers. (Highlighting and Underlining Added)

(33) The industrial burner can also be designed as a recuperator burner, where an integrated recuperator, through which the combustion air and combustion exhaust gases flow in countercurrent, is assigned to the combustion chamber. It is also possible to operate the burner with an external recuperator if needed, or with external air preheating. (Highlighting and Underlining Added)

(4) A **lateral air supply stub 15** is connected to the jacket tube 1 outside the furnace wall 3; a combustion air valve 16 is located in this stub 15, and **optionally preheated combustion air** can be supplied by way of the stub 15. The combustion air supply stub 15, together with the jacket tube 1 and the combustion air valve 16, forms the air supply device, which as seen from the drawing is shaped such that all the combustion air supplied acts upon the combustion chamber 9 and emerges from the outlet opening 10 thereof. (Highlighting and Underlining Added)

(15) As soon as the **furnace chamber 4 has been heated to the ignition temperature of the fuel** assigned to the outer fuel lance 17, which is ascertained by a temperature sensor 33 protruding into the furnace chamber 4, **the control unit 30 switches the burner over to a second operating state**; to do so, it closes the first fuel valve 22 and opens the second fuel valve 23. **This switchover may be done in stages or continuously.** (Highlighting and Underlining Added)

(16) In this **second operating state**, no further fuel is introduced into the combustion chamber via the radial nozzles 25, and as a consequence the combustion process in the combustion chamber 9 is essentially suppressed entirely. At the same time, fuel is now fed into the furnace chamber exclusively through the axial second fuel nozzle 26 that discharges into the furnace chamber 4 in the vicinity of the mouth of the outlet opening 10. Because of the injector action of the combustion air jet or stream outflowing at unreduced impetus from the outlet opening 10, **a mixture of combustion exhaust gas and air into which the fuel is introduced forms in the furnace chamber 4 in the vicinity of the mouth of the outlet opening 10.** Since the **furnace chamber 4 has heated up to the ignition temperature** of the fuel, the reaction of the fuel with the combustion air now takes place in a developing reaction zone in the furnace chamber 4 that is located outside the combustion chamber 9. (Highlighting and Underlining Added)

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(17) In this reaction zone, depending on the reaction conditions established, the reaction of the fuel with the combustion air can take place with flame development, but **an essentially flame and pulsation-free reaction can also be established**. (Highlighting and Underlining Added)

(18) **NO.sub.x emissions** in the **first operating state**, that is, the startup state, are already relatively slight; in any case, they are within the legally stated limits. In the **second operating state**, which is the normal operating state, **NOx emissions are further lowered by from one to two orders of magnitude compared with conditions in the first operating state**. Depending on the heating chamber temperature, they can even be lowered to the range below 1 ppm. (Highlighting and Underlining Added)

In regard to **claims 1, 3, 5, 7, 8 and 10**, for the purpose of lowering the NOx emissions of the second mode or state of operation by from one to two orders of magnitude compared with conditions in the first operating mode or state, it would have been obvious to a person having ordinary skill in the art to modify the air supply of **US 3418062 (Hovis et al)** to be that of pre-heated air and to further modify the burner components such that when operating the gas regulation system between a first mode feeding fuel to the central lance (91) and a second mode feeding fuel to the at least one outer lances (116), respectively, it is possible to continuously switch from a flame functioning mode wherein a flame is present within the pre-chamber (84') of the burner to a flameless functioning mode (i.e. - invisible, flame-free, etc.) wherein combustion occurs downstream and outside of the pre-chamber (84'), in view of the teaching of **US 3958413 (Cornelius et al)** or **US 5570679 (Wunning)**.

Regarding claim 1, the recitation "means for varying the distribution percentage of the combustible gas between the inner central lance and the outer side lances" meets the criteria for 35 USC 112, 6th paragraph. However, it is noted that any structure associated with this means-plus-function recitation is limited to "means for varying the distribution percentage of the combustible gas between the inner central lance and the outer side lances". This limitation under 35 USC 112, 6th paragraph can not be understood to include structural limitations which go beyond that for accomplishing the operation, or function, of varying the distribution percentage of the combustible gas between the inner central lance and the outer side lances. It is important to understand the degree to which this means-plus-function recitation and positively defines structure of the claimed apparatus. More specifically, while this means may be associated with that part of the invention forming the "flame functioning mode" and "flameless functioning

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mode” discussed in the claim, it addresses only that portion of the invention necessary for “distribution percentage of the combustible gas between the inner central lance and the outer side lances” when, or “of”, an operation of the burner under conditions (e.g.- proper temperature of pre-heated air, pre-heated combustion chamber temperatures, proper fuel air mixture, etc.) necessary to achieve “flame functioning mode” and “flameless functioning mode”. In this regard, while the claim does include the recitation(s) “switching from a flame functioning mode of the burner” and “to a flameless functioning mode”, there is no actual structure present in the apparatus claimed which would necessarily cause the presently claimed burner and oven arrangement to actually form or bring about actual “flameless” functioning mode. That is, merely reciting that fuel flows through “the outer lances” fails to provide a positive recitation of structure to patentably distinguish the invention over the same structure in **US 3418062 (Hovis et al)**. As such, the recitation “flameless functioning mode” can be viewed as nothing more than merely a recitation of intended use which fails to further define structural difference(s) between the claimed invention and the prior art which patentably distinguish(s) the claimed invention from the prior art. And, the prior art relied on in the present rejection of the claims is capable of performing the intended use. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. Similarly, in **US 3418062 (Hovis et al)** the inner lance (92' or 90') and the at least two outer lances (16) do indeed convey a combustible gas. Likewise, the “single” air duct in **US 3418062 (Hovis et al)** does indeed convey air. As such, it is therefore capable of conveying pre-heated air, noting there being no pre-heated air means, or source, recited in applicant the claim. Additionally, since the only broadly recited structure which goes to make up the claimed invention does not differ from that shown and disclosed in **US 3418062 (Hovis et al)**, and the prior art burner is capable of performing the recited function of “continuously switch from a flame functioning mode of the burner to a flameless functioning mode” is deemed to be merely a method or process limitation which fails to impart any positive recitation(s) of structure to the apparatus claims. Furthermore, the recitation “... having low emissions of polluting agents ...” has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any

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patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

Nevertheless, rather than make any further attempt at interpreting the scope of applicant's otherwise vague, indefinite and broadly claimed invention in comparison with **US 3418062 (Hovis et al)**, the prior art references of **US 3958413 (Cornelius et al)** and **US 5570679 (Wunning)** are relied on to teach that it would have been obvious to a person having ordinary skill in the art at the time of the invention to operate a flame mode switching type burner such as **US 3418062 (Hovis et al)** under conditions capable of producing a flameless mode when the flame is moved out of a pre-chamber and stabilized in the reaction chamber for various rates of fuel and air flow by suitable modulation of the fuel and pre-heated air.

In regard to **claim 1**, the recitation "having low emissions of polluting agents" has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

In regard to the at least two outer lances recited in **claim 1**, the **US 3418062 (Hovis et al)** passages (116, 116') for combustible gas are deemed to be the structural and functional equivalent to applicants only broadly claimed at least two outer lances. That is, since the claims lack any particular structure of the lances that would necessarily distinguish them from the passages in **US 3418062 (Hovis et al)**.

Claims Rejected under 35 U.S.C. 102(b)

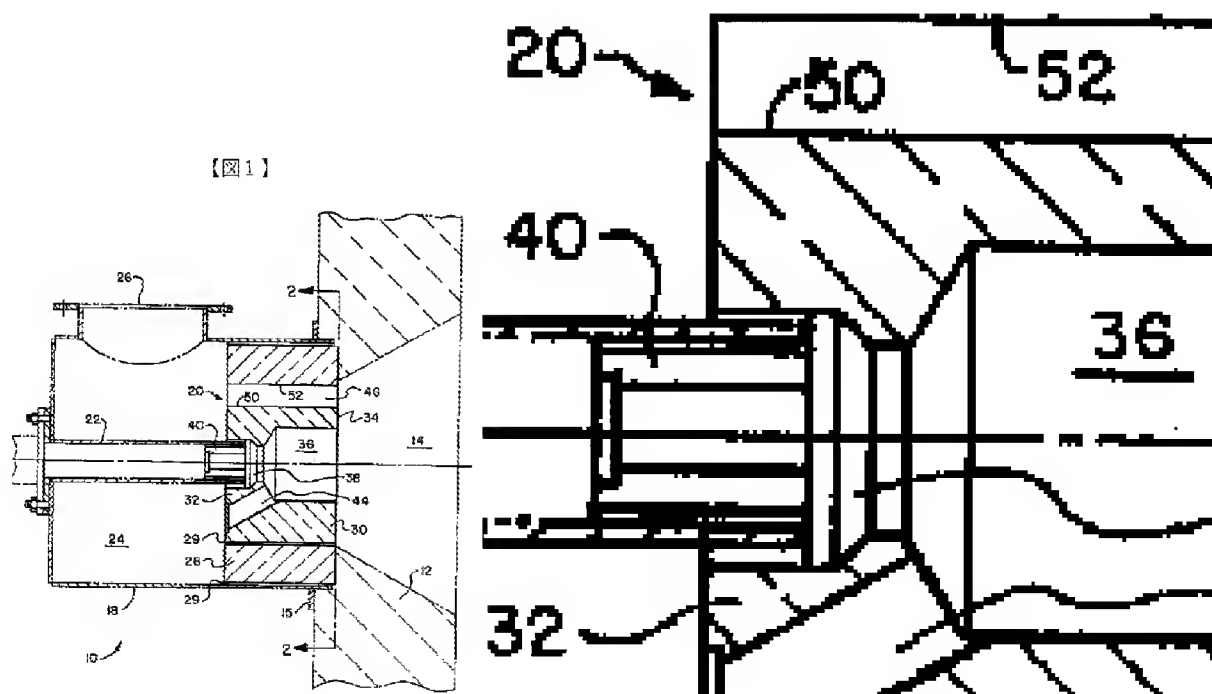
Claims 2, 3, 5, 7, 8 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by **US 3418062 (Hovis et al)** in view of **US 3958413 (Cornelius et al)** or **US 5570679 (Wunning)**, as applied to claim 1 above, and further in view of **JP 07-190319** (of record).

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US 3418062 (Hovis et al) shows and discloses the invention substantially as set forth in the claims with possible exception to:

- a free annular crown being defined between the inner surface of said central hole and the external diameter of said tip portion of the inner central lance, said free annular crown being in communication with said plenum thereby allowing the passage of a sufficient quantity of pre-heated air suitable for preventing the overheating of the inner central lance.

JP 07-190319 teaches, from applicant same central lance type burner field of endeavor, shows a refractory unit (20) with a free annular crown (i.e. – the free space about the distal end of lance) and being defined between the inner surface of said central hole (generally 38) and the external diameter of said tip portion (the distal end located within the refractory body recess) of the inner central lance, said free annular crown being in communication with said plenum (24) thereby allowing the passage of a sufficient quantity of air there around, which would necessarily act to cool the tip of inner central lance.



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In regard to **claim 2**, for the purpose of cooling the tip of the central lance, it would have been obvious to a person having ordinary skill in the art at the time of the invention to form an annular gap about the tip of the central lance located in the refractory body recess of **US 3418062 (Hovis et al)**, in view of the teaching of **JP 07-190319**.

In regard to **claim 3**, **US 3418062 (Hovis et al)** shows (see the annotated figures herein below) nozzles (88') for the air housed in the second region.

In regard to **claim 5**, **US 3418062 (Hovis et al)** shows the first region comprising a cavity (84') communicating with the combustion chamber (76') and into which the air from the series of calibrated holes (88') flows together with the combustible gas injected through the inner lance.

In regard to **claims 7, 8 and 10**, **US 3418062 (Hovis et al)** shows the nozzles of said series of nozzles situated at an equal distance along a coaxial circumference with the inner lance (90', 92') and lying on a base surface of the second region (see the annotated figures herein below).

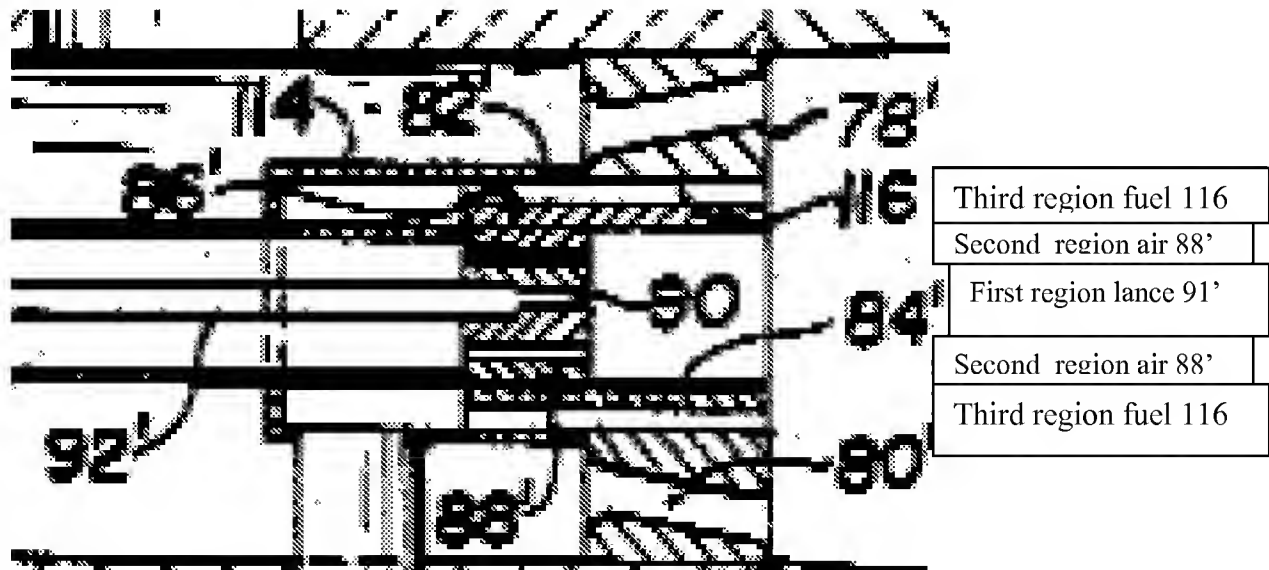
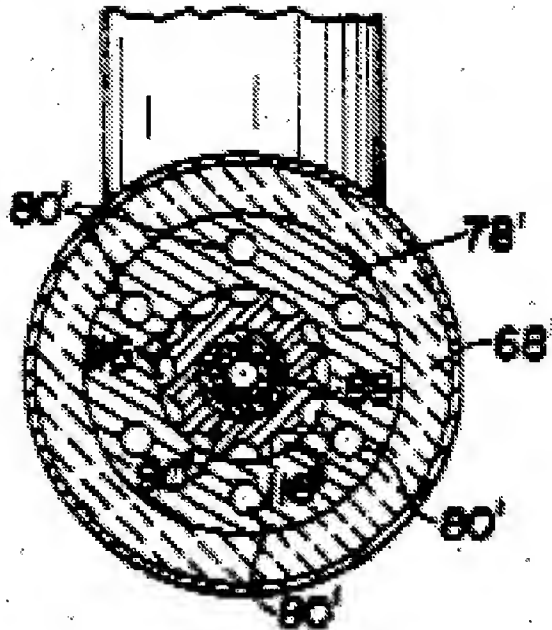


Fig. 9



Claims Rejected under 35 U.S.C. 103(a)

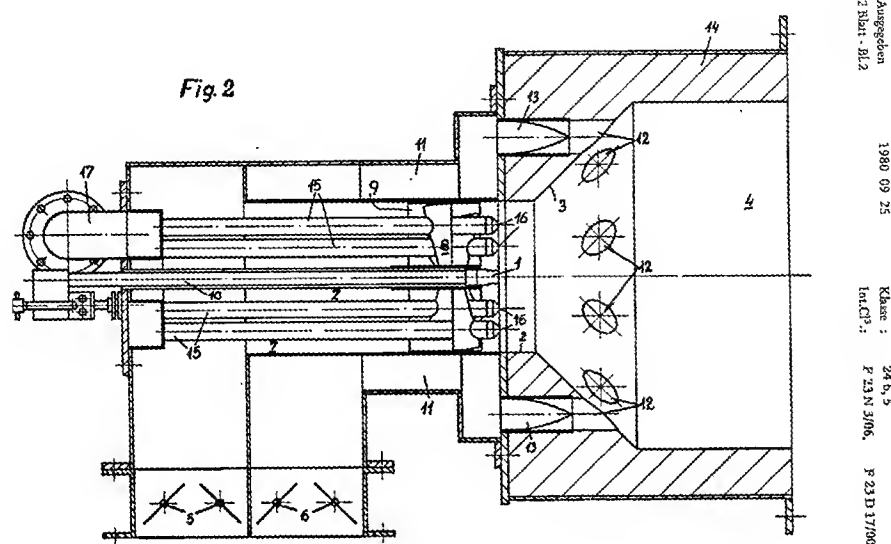
Claims 4, 10-21 and 26-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 3418062 (Hovis et al) in view of US 3958413 (Cornelius et al) or US 5570679 (Wunning) and JP 07-190319, as applied to claims 1-3, 5, 7, 8 and 10 above, and further in view of AT 358702 (of record).

US 3418062 (Hovis et al) shows and discloses the invention substantially as set forth in the claims with possible exception to;

- the first flame producing region of with a flame detector and ignition device;
- the various design relationships, dimensions and ratios set forth in applicants' claims;
- means to protect the lances therein;
- inner refractory insulation material; and
- a perforated flange.

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AT 358702 teaches, from applicant's same burner field of endeavor, a burner including at least two pass-through holes (12) for housing at least two outer side lances (13) as a means for communicating and directing a fluid to the combustion chamber.



In regard to **claims 4, 10-21 and 26-29**, since selection of the relative dimensions the various elements which go to make up a given burner design, as well as the orientation of those elements with respect to the oven wall, would necessarily depend on numerous interrelated design concerns such as, the overall size and shape of the burner, the type of fuel gas combusted, any desired flame shape and size, the size and shape of the combustion chamber, characteristic of any material being heated within the combustion or work chamber, etc., to configure a burner such as **US 3418062 (Hovis et al)** according to the design relationships, dimensions and ratios set forth in applicants' claims can be viewed as nothing more than merely a matter of choice in design absent the showing of any new or unexpected results produced therefrom over the prior art of record. Furthermore, in regard to **claims 4, 5, 7, 11, 12 and 13**, the term calibrated can only be given the meaning of "selected", since the term "calibrated" is not defined by the claim. Therefore, since the passages of **US 3418062 (Hovis et al)** would necessarily have been selected, they are therefore understood to be the structural and functional equivalent to applicants' only broadly claimed "calibrated holes".

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In regard to **claim 6**, Official Notice is taken that flame detectors and ignition devices are known to be necessarily placed in the region of flame formation of burners. Therefore, in view of that which is well known it would have been obvious to a person having ordinary skill in the art to provide the first flame producing region of **US 3418062 (Hovis et al)** with a flame detector and ignition device (see for example: US 3224487, US 4643672).

In regard to **claims 7, 8 and 10**, **US 3418062 (Hovis et al)** shows the base surface of the second region and the base surface of the third region of the refractory unit being coaxially aligned with an internal wall (70) of the oven.

In regard to **claims 9, 23 and 24** for the purpose of providing suitable alternative means for communicating and directing a supply of fuel gas to the combustion chamber, it would have been obvious to a person having ordinary skill in the art to form the at least two outer side passages (116') **US 3418062 (Hovis et al)** as at least two pass-through holes for housing at least two outer side lances, in view of the teaching of **AT 358702**. In regard to claims 23 and 24, in particular, the passages, or holes, (12) which encompass the lances (13) of **AT 358702** each necessarily act to protect the lance therein. As such, when modified to include at least two pass-through holes for housing at least two outer side lances as taught by **AT 358702**, the portion of the metal body supported refractory hole (12) surrounding the lance would act to protect the lance therein, at least in the manner only broadly set forth in applicants' claims.

In regard to **claim 22**, Official Notice is taken that it is well known in the art of burners to apply fiber insulation material as a refractory material in metal burners. Therefore, in view of that which is known and for the known purpose, it would have been obvious to a person having ordinary skill in the art to form the inner refractory insulation material of **US 3418062 (Hovis et al)** of a fiber material.

In regard to **claim 25**, **US 3418062 (Hovis et al)** shows the entirety of the burner housing being on the wall of a furnace (72) by a flange (not referenced). As such, the component elements such as the lances (116') within the burner are therefore supported by the burner flange. In addition, with regard to the flange, Official Notice is taken that burner flanges are known to have perforations for receiving mounting bolts. While not shown in **US 3418062 (Hovis et al)**,

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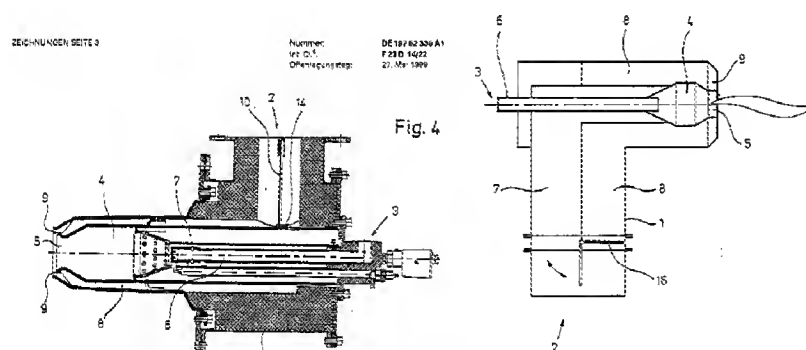
it would have been obvious to a person having ordinary skill in the art to provide the flange of **US 3418062 (Hovis et al)** with bolt holes or perforations, in view of that which is known in the art of burner installation.

Conclusion

See the previously presented and attached USPTO form 892 for prior art made of record and not relied upon which is considered pertinent to applicant's disclosure.

See **DE 19752335 A1** which discloses air-inlet (2) for pre-heatable combustion air:

Fig. 11



ABSTRACT:

CHG DATE=19990902 STATUS=N>A housing (1) has a combustion chamber (4) with nozzle outlet (5) and air-inlet (2) for pre-heatable combustion air, and a gas-inlet (3). A gas lance (6) attached to the gas-inlet leads to the combustion chamber. A primary air guide (7) connected to the air-inlet leads to the combustion chamber. A secondary air guide (8) enclosing the combustion chamber and connected to the air-inlet opens out into a ring of radiation nozzles (9) on a level with the nozzle-outlet. An adjustable distributor distributes the pre-heatable combustion air to the primary and secondary air guides. A control is attached to the drive for the distributor and to at least one sensor for detecting stove/furnace temperature and or combustion air temperature.

THIS ACTION IS MADE FINAL

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

USPTO CUSTOMER CONTACT INFORMATION

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carl D. Price whose telephone number is (571) 272-4880. The examiner can normally be reached on Monday through Friday between 9:00am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven B. McAllister can be reached on (571) 272-6785. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Carl D. Price/

Primary Examiner, Art Unit 3749